

REMARKS

Claims 1-26 remain in the application. Applicant respectfully requests reexamination.

Claims 1-26 were rejected under 35 U.S.C. § 103(a) as unpatentable over *Rutledge et al.* (EP 0866581A1) and *Mazurenko et al.* (Spectral Coding For Secure Optical Communications Using Refractive Index Dispersion, Optical Communications 133 (1997) 87-92). Applicant respectfully traverses.

Rutledge teaches a encryption system wherein an electronic signal is encrypted with a key. This electronically encrypted signal is then used to modulate an optical beam with a first type of modulation scheme. The key signal is used to modulate the same optical beam with a second type of modulation scheme. *Rutledge* does not teach the use of an integrated optics encryption device. Integrated optics require a set of waveguides in a planar substrate.

Mazurenko teaches the use of incoherent interferometry, also known as white light interferometry, for encryption. This type of interferometer uses a path length difference between the two legs of the interferometer that exceeds the coherence length of a light source. The result is that the phase difference between the two legs is not defined. Furthermore, *Mazurenko's* disclosure teaches the use of a static code that is based on the dispersive plates whose properties cannot be readily changed.

Combining *Rutledge* with *Mazurenko* would result in a triple encoded message signal, two encryptions according to *Rutledge's* teaching, one electronic, one optical, and a third static encryption according to *Mazurenko's* teaching. This triple encoded signal is not the present invention.

In the present invention, the signal is encrypted only once, utilizing integrating optics, which allows the signal and key bits to be changed at Gigahertz rates. Any combination of *Rutledge* and *Mazurenko* would not result in systems that can be modulated at gigahertz rates.

Specifically, neither *Rutledge* or *Mazurenko* describes or teaches an integrated optics encryption device which, according to claim 1, uses "a message signal source connected to the waveguide for controlling the refractive index; and a key signal source connected to the waveguide for controlling the refractive index." Which, according to claim 5, uses "a multi-functional integrated optics chip having an input, an output, a message signal input and a key signal input; and a coherent light source connected to the input of the integrated optics chip." Which, according to claim 13, uses "a multi-functional integrated optics chip having an input, an output, a message signal input, a key signal input, and two divergent paths with mirrored ends." Which, according to claim 18, uses "a multi-functional integrated optics chip having an input, a message signal input, a key signal input, and an encrypted message output," and "means for producing exclusive or functionality based on the message signal input and the key signal input." Which, according to claim 22, sets forth a method for encryption using interference from a coherent light source having the step of "issuing predetermined signals to the two paths of the multi-functional integrated optic chip where a message signal input is attached to one path of the multi-functional integrated optics chip and a key signal input is attached to the other path." Which, according to claim 26, sets forth a method for decryption using interference from a coherent light source which uses the step of "issuing predetermined signals to the two paths of the multi-functional integrated optic chip wherein an encrypted message signal input is attached to one path and the multi-functional integrated optics chip and a key signal input is attached to the other path."

Applicant respectfully requests that the rejection of claims 1-26 be withdrawn.

Applicant has reviewed the art made of record, but not relied upon. Applicant submits that none of this art, either singly or in any combination between itself, or with *Mazurenko* or *Rutledge*, would render the claims unpatentable.

In light of the above amendment and remarks, applicant believes that all the claims are in condition for allowance and respectfully requests that the claims be allowed and this application passed to issue.

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Signature

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Respectfully submitted,

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